

Short communication

Effect of various doses of paclobutrazol on incidence of mango malformation

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Mango (*Mangifera indica* L.), the world's most luscious fruit has been recognized as the 'king of fruits' in India long back. India ranks first in area and production of mango in the world (Shikamany and Sudha, 5). Mango malformation is of two types vegetative and floral, the former being more common on the nursery seedlings and young plants and the later, on trees at the bearing stage. It is the floral malformation which directly affects the productivity. The disease is characterized in the growing plants by production of multiple shoots with rudimentary leaves from either at leaf and or at the base of the shoot, which gives an impression of bunchy top. These symptoms are very usually seen in vegetative malformation. In floral malformation because of short internodes length and thickened peduncle, the malformed peduncles give the appearance of compact mass of flowers which are mostly male (Majumder and Sinha, 3). The peduncles keep hanging on tree for many more months without any fruit set.

The experiment was conducted at the Main Experiment Station, Department of Horticulture, Institute of Agricultural Science, Banaras Hindu University, Varanasi. The experiment was conducted on mango cultivars Dashehari, Langra and Chausa, which are the most popular varieties among north Indian mango cultivars and exhibit malformation behavior.

Treatments were laid out in factorial randomized block design with three replications. Application of different doses of paclobutrazol viz., 2.5, 5.0 and 7.5 g per canopy diameter along with control was done. Paclobutrazol was applied once in a year, i.e. 15th September in soil around the tree canopy spread and in the next year half dose was applied, in view that the paclobutrazol possesses 50 per cent residual effect after one year of its application in the soil/plant. The following observations were recorded on healthy panicles, malformed panicles, medium panicles and severe malformed panicles.

The results (pooled over two years) of the present study are presented in the Table 1. Among cultivars,

significantly highest percentage of healthy panicle was recorded in cultivar Dashehari (84.43 and 86.01%) followed by Langra (82.83 and 83.65%) and lowest was in Chausa (79.97 and 81.49%) during both the years. With regard to various doses of paclobutrazol, significantly highest percentage of healthy panicle was recorded in 5.0 g paclobutrazol (86.50 and 88.04%) both at par followed by 7.5 g paclobutrazol (84.03, 85.26%) in the second year. The lowest percentage of healthy panicle was recorded in control (75.46 and 77.40%) during both the years. Interaction between cultivars and paclobutrazol was found to be non significant in healthy panicle during first and second year. Kumar (2) reported that higher concentration is more effective than lower doses of paclobutrazol. Higher doses of paclobutrazol increased in per cent of healthy panicle compared to lower doses of paclobutrazol.

It is obvious from the data presented in Table 1 that among cultivars, malformed panicles were significantly lower in Dashehari (15.51 and 13.39%) followed by Langra (17.77 and 15.64%) and higher in Chausa (19.58 and 18.29%) during both the years. Various doses of paclobutrazol differed significantly during both the years. Malformed panicles were less with 5.0 g paclobutrazol (13.25 and 13.87%) followed by 7.5 g paclobutrazol (15.41 and 15.26%) during both the years and highest numbers of malformed panicles were recorded in control (23.40 and 18.60%). Interaction between cultivars and paclobutrazol was non-significant in malformed panicles during first year. Significantly lowest malformed panicles were noted in Dashehari × 5.0 g paclobutrazol treatment, this was similar with Dashehari × 7.5 g paclobutrazol, Langra × 5.0 g paclobutrazol and Chausa × 5.0 g paclobutrazol during second year. Malformed panicles were highly affected by the climatic conditions and the results varied in both the years. Paclobutrazol appear to control malformation. The control of malformation may be because of antifungal nature of paclobutrazol (Fletcher *et al.*, 1).

Among cultivars significantly lower number of light, medium and severe malformed panicles was recorded in cultivar Langra (2.88 and 2.59%) followed by Chausa (3.59 and 2.71%). Significant variations were also observed with various doses of paclobutrazol

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Table 1. Effect of paclobutrazol treatment on incidence of malformation in mango cvs. Dashehari, Langra and Chausa (Pooled over two years).

Treatment	Healthy panicles (%)	Malformed panicles (%)	Partially malformed panicles (%)	Light malformed panicles (%)	Medium malformed panicles (%)	Severe malformed panicles (%)
Cultivar						
V1 (Dashehari)	85.22	14.45	1.83	3.205	3.425	4.45
V2 (Langra)	82.99	16.705	2.68	2.795	4.635	5.48
V3 (Chausa)	80.73	18.935	3.05	3.335	3.905	6.405
CD at 5%	1.495	1.03	0.17	0.28	0.27	0.385
Paclobutrazol doses						
To (Control)	76.43	21	3.46	5.375	5.675	6.985
T1 (Paclobutrazol @ 2.5 g/tree)	83.57	16.895	2.39	2.555	3.54	5.15
T2 (Paclobutrazol @ 5 g/tree)	87.27	14.255	1.98	2.165	3.205	4.7
T3 (Paclobutrazol @ 7.5 g/tree)	84.645	14.64	2.25	2.35	3.435	4.935
CD at 5%	1.715	1.19	0.2	0.32	0.31	0.445
V x T Interaction						
V1 x T0 (Dashehari x control)	80.01	18.59	2.18	6.02	4.35	5.665
V1 x T1 (Dashehari x Paclobutrazol @ 2.5 g/tree)	85.665	14.78	1.82	2.365	3.28	4.155
V1 x T2 (Dashehari x Paclobutrazol @ 5 g/tree)	88.245	11.465	1.62	2.15	2.96	3.93
V1 x T3 (Dashehari x Paclobutrazol @ 7.5 g/tree)	86.865	12.96	1.7	2.29	3.1	4.04
V2 x T0 (Langra x control)	77.37	21.365	3.89	4.375	6.92	7.55
V2 x T1(Langra x Paclobutrazol @ 2.5 g/tree)	83.075	16.64	2.42	2.56	4.03	4.965
V2 x T2 (Langra x Paclobutrazol @ 5 g/tree)	87.36	12.755	2.1	1.975	3.73	4.615
V2 x T3 (Langra x Paclobutrazol @ 7.5 g/tree)	84.145	15.14	2.3	2.26	3.86	4.775
V3 x T0 (Chausa x control)	71.91	23.045	4.32	4.38	5.75	7.73
V3 x T1(Chausa x Paclobutrazol @ 2.5 g/tree)	81.965	18.35	2.92	2.75	3.61	6.335
V3 x T2 (Chausa x Paclobutrazol @ 5 g/tree)	86.06	13.515	2.2	2.365	2.915	5.56
V3 x T3 (Chausa x Paclobutrazol @ 7.5 g/tree)	82.73	15.81	2.76	2.505	3.345	5.99
CD at 5%	NS	1.78	0.35	0.48	0.54	NS

during both the years. Percentage of light, medium and heavy malformed panicles were lower with 5.0 g paclobutrazol (2.26 and 2.07%), which was similar with 7.5 and 2.5 g paclobutrazol. The highest light, medium and severe malformed panicles were recorded in control (6.36 and 4.39%) during both the years. Interaction between cultivars and paclobutrazol light malformed panicles showed differences, being lowest in Langra × 5.0 g paclobutrazol followed by Langra × 7.5 g paclobutrazol and was the highest in Dashehari × control during first year and non-significant effect was observed in the second year. Interaction effect on medium malformed panicles was recorded lower in Chausa × 5.0 g paclobutrazol (3.0 and 2.83%), which was similar with Dashehari × 2.5, 5.0 and 7.5 g paclobutrazol and Chausa × 7.5 g paclobutrazol

(3.40; 3.0; 3.20; 3.16; 2.92, 3.0% and 3.43, 3.26, respectively. The highest percentage was observed in Langra x control (7.48 and 6.36%) during both the years. Interaction effects on heavy malformed panicles were found non-significant during both the years. Similar findings were also reported by Kumar (2). However, Ram and Yadav (4) reported in mango that the malformation intensity was reduced along with malformis levels in high density Dashehari plantation and malformation was reduced to less than 0.1% by shoot pruning after the crop harvest and with the use of paclobutrazol.

On the basis of foregoing results it can be concluded that 5.0 to 7.5 g paclobutrazol concentrations were effective to minimize all types of malformed panicle.

REFERENCES

1. Fletcher, R.A., Hofstra, G. and Gao, J. 1986. Comparative fungitoxic and plant growth regulating properties of triazole derivatives. *Plant Cell Physiol.* **27**: 367-71.
2. Kumar, A. 1999. Effect of paclobutrazol in growth, flowering, fruiting and yield of mango cultivars. Ph.D. thesis. GB Pant University of Agriculture and Technology, Pantnagar.
3. Majumder, P.K. and Sinha, G.C. 1972. Studies on the effect of malformation on growth, sex ratio, fruit set and yield of mango. *Acta Hort.* **24**: 230.
4. Ram, Sant and Yadava, V.K. 1999. Mango malformation- a review. *J. Appl. Hort.* **1**: 70-78.
5. Shikamany, S.D. and Sudha, M. 2004. Lucrative export possibilities. *The Hindu Survey of Indian Agriculture*, pp. 122-25.

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